

Contributions to the Fauna of Western Australia, No. 4. A Fresh-water Isopod *Phreatoicus palustris*, n. sp.

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This crustacean was first discovered in February, 1923, by Mr. K. Sheard, a monitor of the Perth Boys' School, in Smith's Lake, North Perth, whilst collecting specimens for the Biological Laboratory of the school. Subsequently a number of the animals were brought to the Museum alive, where several of them were kept under observation in a glass vessel, on the bottom of which a quantity of mud had been placed. The mud was covered with from three to four inches of water to which rain-water was added from time to time in order to balance loss by evaporation.

The animals were evidently quite at home, for several of them paired, and the noticed mortality among them was very slight. When pairing the male seized the female with his powerfully developed gnathopods making no use at all of the fourth pair of pereopods which, therefore, do not show the modifications noted in *P. australis*, *P. capensis* and *P. shephardi*.

Ecdysis is rarely completed in one action, I have often seen animals with the old "skin" shed from the pleon and telson and have but on one occasion observed the complete "skin" lying on the muddy floor, and then not in one piece.

The animals are fairly active and exceedingly quick at burrowing into the soft muddy bottom, but at times they will, when disturbed, lie motionless, evidently relying upon their coloration for protection. They spend much of the day in the soft muddy bed of their home, and when not burrowing, prefer dark or shady corners. Their food seems to consist of animal and vegetable matter, and they make most efficient scavengers.

I have reasons to believe that they are most active at nighttime.

Sub order PHREATOICIDEA, Stebbing, 1893.*

Family PHREATOICIDAE, Chilton, 1891.

Body subcylindrical, more or less laterally compressed. Mandibles with a well developed appendage. Legs distinctly divided into an anterior series of four, and a posterior series of three. Pleopoda broad and foliaceous and branchial in function, but not protected by an operculum. Pleon large of six distinct segments. Uropoda styliform.

* See list of references at the end of this paper.

Genus PHREATOICUS, Chilton, 1882 and 1894.

Body long, subcylindrical, laterally compressed (seen chiefly in the pleon). Upper antenna short, lower long, with flagellum. Mandible with an appendage. First pair of legs subchelate in both sexes, but larger in the male than in the female, others simple (the fourth pair in the male slightly modified so as to be almost subchelate). Legs divided into an anterior series of four, and a posterior series of three. Pleon long, of six distinct segments, last joined to the telson. Uropoda biramous styliform. Telson large, subconical.

The genus *Phreatoicus* was established by Chilton in 1882 to include a blind Isopod Crustacean, found in wells near Canterbury, New Zealand, to which the name *Phreatoicus typicus* was given.

In 1891 the same author described a species, *P. australis*, discovered by the late Richard Helms on Mt. Kosciusko, at an altitude of 5,700ft., this species possesses well developed eyes, it has also been found in Tasmania and Victoria. Another blind form, *P. assimilis*, from wells near Canterbury, N.Z., was described by Chilton in 1894. A second species from Tasmania, *P. tasmaniae*, was founded by G. M. Thomson in the same year, and in it was included a young specimen which he had in 1892 regarded as *P. australis*.

In 1900 O. A. Sayce described a blind species from the Dividing Range, Victoria, at an altitude of 2,000ft., as *P. shephardi*, this form has subsequently been collected at Barrington Tops, N.S.W., in subalpine surroundings, 5,000ft., by C. Hedley (Chilton, 1916). A third blind New Zealand species *P. kirkii* was recorded from a freshwater lagoon in 1906, with a variety *P. kirkii dunedinensis*, from streams near Dunedin, N.Z.

In 1909 G. Smith described two new Tasmanian species from the Great Lake, altitude 3,000ft., *P. spinosus* and *P. brevicudatus*, the former of which is considered by Barnard (1914), as possibly only a larger form of Thomson's *P. tasmaniae*, an opinion shared by Chilton (1917—p. 385). A species found "near the reservoir on the top of Table Mountain under the moss growing on the stones in the bed of a swiftly running stream at an altitude of about 3,000ft." was described as *P. capensis* by Barnard in 1914.

The Triassic Wianamatta Shale of St. Peter's Brickworks, Newtown, Sydney, N.S.W., has yielded a number of fossil crustaceans which were described by Chilton in 1917 under the name of *P. wianamattensis* as "closely similar to existing Australian species such as *P. australis* and *P. shephardi*" (Chilton 1917—p. 24).

Finally, in 1922 Chilton dealt with a new species, *P. latipes* "collected in June, 1920, in artesian water from the Hergott (Marree) bore, in Central Australia, a little South of Lake Eyre." Professor F. Wood-Jones, who made the discovery has subsequently

found this species in "the mound springs near Coward, just to the Westward of Lake Eyre South." There are many of these springs which "vary greatly in salinity and temperature, but the animals are found in all the springs, from Bullakaninna to Coward, an area of some 30 miles."

PHREATOICUS PALUSTRIS—n. sp.

Specific diagnosis. Body rather slender, laterally compressed, particularly in the pleon, surface smooth,* with numerous short scattered hairs, eyes prominent, sub-circular, well developed, head about as long as the first and second peraeon segments, without a lateral groove. First antenna as long as the peduncle of the second, the second long, about three-fourths of the total length, fourth joint of the peduncle as long as the first three, fifth slender, as long as the second, third, and fourth combined. First peraeon segment fused to the head (suture distinct), shorter than the second segment, emarginate in front, straight behind, its shortest dimension in the middle line, second, third, and fourth segments sub-equal, longer than the fifth, sixth, and seventh.

Pleon long and deep, equal in length to peraeon segments 2—7, fifth segment slightly shorter than the first and second or third and fourth, posterior margin of segments 1—3 slightly concave, fourth segment with a shallow notch, fifth segment deeply notched, sixth segment fused to the telson, suture oblique, distinct laterally. Uropoda long, the basal joint reaching the end of the telson, inner ramus as long as the basal joint, with a pair of strong terminal spines, outer ramus shorter and less robust, the apex crowned with a terminal spine and several spinules and hairs. Telson convex above, with a concavity in front of the terminal projection, convex below, with numerous spines, spinules and hairs, particularly on the margins.

Length (when extended) about 15mm. The largest specimen measured was a male 17mm. long, the largest female was 15mm. Specimens 10mm. long have been noticed pairing. The breadth throughout is about 2.5mm. in a specimen 15mm. long.

Colour.—This may vary with the surroundings, but the majority seen were a dark olive brown, darkest on the dorsal region, which is separated on the peraeon and pleon from the somewhat paler margin by a light crescentic marking on each of the segments, head marbled, flattened basis and the ischium of peraeopoda five, six and seven with pale blotches, mottlings on the other joints of the legs.

On examination with a high-power lens, the coloration resolved itself into a mass of blackish stellate markings (chromatophores) on a paler background, which is identical in colour with the crescentic patches of the dorso-lateral band.

* The surface is smooth in the living animal, spirit specimens develop irregularities.

Animals kept in a vessel without a muddy bottom became distinctly paler, almost yellowish, whilst others living in or upon greyish mud soon assumed a hue more in accordance with their surroundings.

Type Locality.—Chinamen's Garden, north end of Smith's Lake, North Perth. Collected by L. Glauert and K. Sheard, February, 1923.

The species has since been found in many of the coastal swamps to the north and south of Perth, but has not yet been met with in the swamps and creeks of the Darling Ranges.

Head, almost rhomboidal in profile, slightly convex in front, with excavate anterior margin, as long as the first and second peraeon segments, eyes large, subcircular, prominent, widely separated, cheek not defined, lateral groove absent, straight below, posterior margin convex. A vertical submarginal groove in front of the eye, interorbital space slightly convex, smooth.

Peraeon, first segment fused to the head, suture oblique, distinct, anterior margin excavate, posterior margin straight, inferior margin convex, anterior angle pointed, posterior angle rounded. Second, third, and fourth segments subequal broader than deep lower margin slightly excavate, anterior angles pointed, posterior angles rounded. Fifth, sixth and seventh segments, narrower and deeper than the preceding, lateral margins convex, angles rounded.

Pleon considerably longer than deep; pleura of segments 1—5 well developed, concealing the pleopoda, their inferior margins rounded, fringed with setae; posterior margins of segments 1—3 slightly concave, segment four with a shallow notch, fifth segment deeply notched; fifth segment measured dorsally slightly shorter than one and two or three and four. Sixth segment fused to the telson, suture visible laterally, sixth segment and telson longer than the fifth, but shorter than the fourth and fifth.

Telson in profile gently convex above with a concavity in front of the terminal projection, lower margin distinctly convex. The terminal projection bears several apical spines and hairs, the lateral prominences are crowded with spines and hairs. Margins very spiniferous and setose.

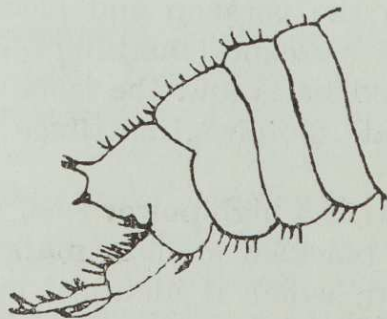


Fig. 1.—Telson, uropod and posterior segments of pleon.

First Antenna as long as the peduncle of the second, peduncle of three joints, first long, about twice as long as broad, second joint

shorter and more slender, third very slender, longer than the first. Flagellum of 8 or 9 joints, slightly tapering and not club-shaped, each joint with a terminal tuft of setae.

Second Antenna long and slender about three-fourths the length of the body, reaching to the third pleon segment, peduncle of five joints first two short and broad, third longer than the first and second, fourth as long as the first three, fifth slender, about as long as the second, third, and fourth; flagellum about twice as long as the peduncle, composed of from 20 to 23 joints, which become gradually more slender as they approach the apex, each joint with a terminal tuft or fringe of setae, the basal joints are fused, the next 4 or 5 short, the rest elongated and unequal.

Mouth parts.—The upper lip, lower lip, and mandibles appear to be normal, it was not possible to see the details of the last in the dissections prepared.

First maxilla.—This appendage bears two curved lobes, the outer longer and broader than the inner, its apex with about fourteen teeth in two series, the inner ones being the shorter, some of the teeth are denticulated on their inner margins. The inner lobe bears six plumose setae on its tip, and two simple spines, one at the outer, the other near the inner margin.

The first maxilla is proportionately shorter and stouter than in the other species of the genus, and the lobes are more curved.

The *second maxilla* very closely approaches that of *P. australis* the fixed inner lobe being much shorter than the two outer articulated members. The two outer lobes are convex externally, their truncated summits bearing numerous long, fine, plumose setae. The rounded tip of the fixed inner lobe bears a number of similar setae and is fringed internally to its base. As in the other species, its inner margin is concave, the outer being slightly convex.

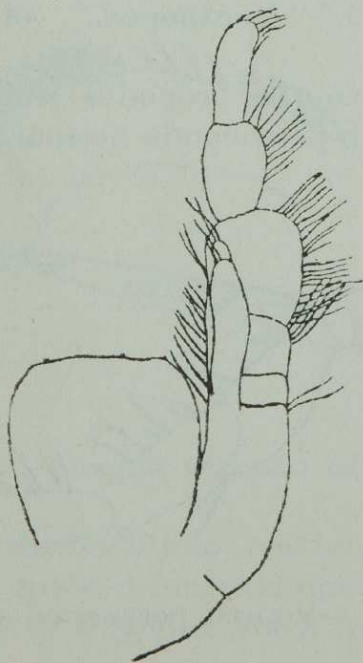


Fig. 2.—Right maxilliped from within.

The *maxillipeds*, of which the right is figured (fig. 2), have the epipodite apparently without hairs or spines along the margin.

Peraeopoda have the coxal joint short but distinct, fused to the segment; the first (gnathopod) is as figured, (fig. 3), young

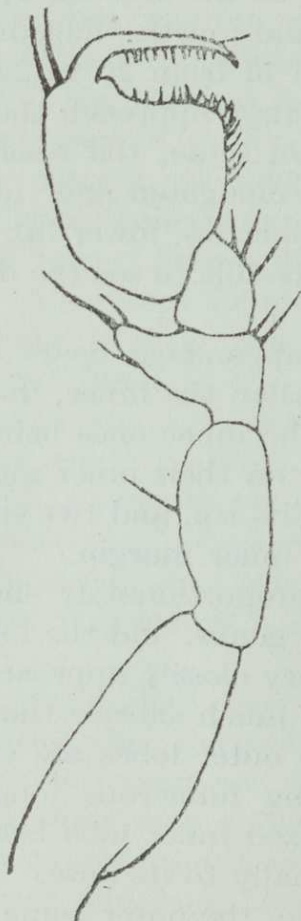


Fig. 3 "Gnathopod" of male.

males and females have the propodus similar but smaller; the second, third, and fourth peraeopoda normal, subequal and slender,

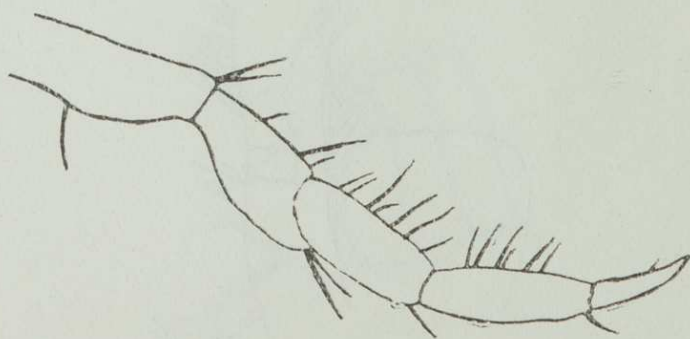


Fig. 4.—Fourth peraeopod of male.

the fourth of the adult male showing no modification for copulatory purposes (fig. 4). The fifth, sixth, and seventh peraeopoda are long and slender, very spinose. The fifth peraeopod is considerably longer than the fourth, the sixth and seventh are longer than the fifth; the basal joint (coxa) of legs, 5, 6 and 7 is partly covered by the pleuron, the basis is flat and produced posteriorly into an oval lobe, which is broadest on the seventh limb, and in every case bears an inferior notch. The coxal joints of the second, third and fourth peraeopoda are distinct, whilst the basis of each of these limbs is flattened though not as considerably as in the three posterior legs.

The *Pleopoda* are normal, they differ from the other Australian species in having more abundant plumose setae. As a rule, in this species, all the longer setae along the margin of the exopodite are markedly plumose.

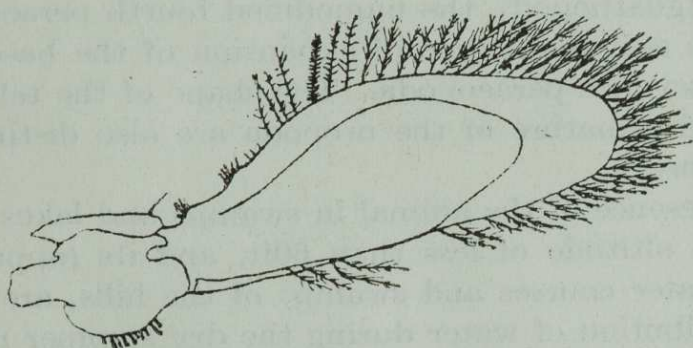


Fig. 5.—First pleopod of male.

The first pleopod of a male (fig. 5), and the second, bearing the penial appendage (fig. 6) which are figured illustrate the great development of the plumose setae.

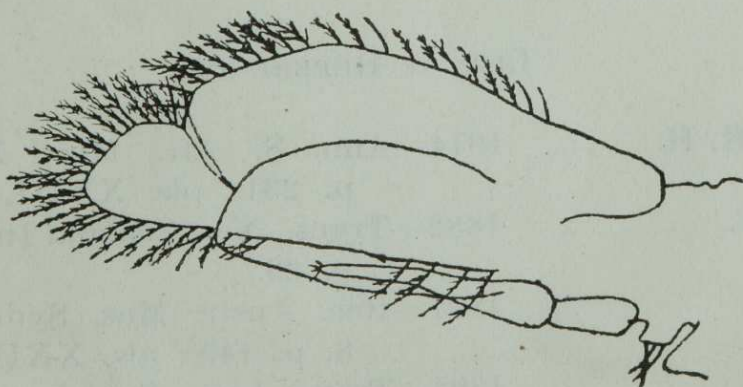


Fig. 6.—Second pleopod of male.

Uropoda are long, the basal joint reaching the end of the telson, the peduncle is stout, grooved longitudinally on its upper surface, each margin bearing 5 or 6 spines which increase in size distally,

the inferior margin is smooth. The inner ramus is as long as the peduncle, bears three spines on its upper margin and one below, it has two large strong terminal spines set in a cluster of smaller spinules and setae, the outer ramus is shorter and less robust, and bears one enlarged terminal spine set among spinules and hairs.

At the base of the peduncle the sixth pleon segment bears several long stout spines, two are placed on a slight swelling or tubercle above the articulation, another is situated between a cluster of setae on the lower margin.

Remarks.—This first Western Australian species of the genus is very unlike the South Australian *P. latipes* and appears to be most closely related to *P. australis* of New South Wales, Victoria, and Tasmania; to *P. shephardi* of New South Wales and Victoria, and to *P. capensis* of Table Mountain, South Africa, from which it is however, easily distinguished by its larger eyes, the size and proportions of the first antenna, the shape of the propodus of the first peraeopod (gnathopod), the unmodified fourth peraeopod of the full grown male and the degree of expansion of the bases of the fifth, sixth, and seventh peraeopoda. The shape of the telson, as well as the size and armature of the uropoda are also distinctive features of importance.

The presence of the animal in swamps and lakes of the coastal plain at an altitude of less than 60ft. and its (apparent) absence from the water courses and swamps of the hills, are probably due to the distribution of water during the dry summer months.

I am indebted to the Director of the Australian Museum, Sydney, for the opportunity of examining specimens of *P. australis* and *P. shephardi*, and to my friend, Professor F. Wood-Jones, of Adelaide, for specimens of the *P. latipes*, which he discovered at Hergott, in 1920.

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